REMARKS

Claims 1 to 19 are pending in the present application. Claim 19 has been withdrawn from consideration following Applicants' election in response to a restriction requirement. Claim 20 has been added herein. Therefore, upon entry of the amendment, claims 1 to 20 will be under examination.

Support for New Claim 20

New claim 20 is supported, for example, by claim 1 as originally filed and by the specification on page 16, lines 16-24, which indicates that the geometry of one or more components of an apparatus of the invention can be changed so long as the detector selectively detects either radiation that is emitted in a direction of about 54.7 degrees from the direction of irradiation polarization or radiation passing a polarizer with pass-axis at about 54.7 degrees from the directed or radiation polarization.

As set forth above, the new claim is supported by the specification and does not add new matter. Accordingly, Applicants respectfully request that the Examiner enter the new claim.

Rejections Under 35 U.S.C. §103(a)

Claims 1, 5, 6, 10, 11, 12, 13 and 18 stand rejected under 35 U.S.C. §103(a) as obvious over Howie et al. (U.S. Patent No. 5,129,723). Applicants maintain that Howie et al. does not teach or suggest the claimed invention.

The Office Action alleges that because Howie et al. describes that signal detectors can be placed at any orientation with respect to a polarized radiation source and flow chamber, it would have been obvious to one skilled in the art to select the optimum value of the position of the detectors for analysis of a desired scattered radiation, including about 54.7 degrees from the direction of polarization and 35.3 degrees from a line parallel to a sample stream trajectory.

Applicants submit that the claimed invention relates to selectively detecting radiation independent of anisotropic radiation emission, rather than to merely placing a detector at any orientation with respect to a polarized radiation source and flow chamber. Specifically, the claimed invention relates to apparatus and methods having specific geometries that allow selective detection of radiation independent of anisotropic radiation emission, whereas Howie et al. describes arranging detectors at various unspecified angles relative to the axis of a laser beam in order to detect light scattering (column 6, lines 43-50, Figure 3).

Regarding claims 1 to 10 and 13 to 18, selective detection of radiation independent of anisotropic effect is achieved by selectively detecting radiation propagated from a flow chamber at about 54.7 degrees from the direction of polarization. In contrast, none of the angles shown in the drawings or described in the text of Howie et al. correspond to the recited anisotropic-independent specific angle of about 54.7 degrees from the direction of polarization, nor is this specific angle suggested by Howie el at. Moreover, Howie et al. does not suggest any desirability for placing a detector in a position to selectively detect radiation propagated from a flow chamber at about 54.7 degrees from the direction of polarization.

Applicants submit that without some suggestion of the desirability of using a geometry recited in the claims, Howie et al. cannot render obvious the claimed invention. Citing In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984), the Federal Circuit pointed out that "while [the prior art] apparatus may be capable of being modified to run the way [applicant's] apparatus is claimed, there must be a suggestion or motivation in the reference to do so." In re Mills, 916 F.2d 680, 682, 16 U.S.P.Q.2d 1430, 1432 (Fed. Cir. 1990). In the present case, description in Howie et al. that light scattering can be measured at various scattering angles in order to produce a Zimm plot, neither suggests the claimed invention nor motivates one skilled in the art to identify a geometry for selectively detecting radiation independent of anisotropic radiation emission.

Regarding claims 11 and 12, which each recite a polarization direction being 35.3 degrees from a line parallel to the trajectory of the sample stream, Howie et al. is silent with respect to use of a polarized radiation source, much less the specific polarization direction with respect to a line parallel to the trajectory of the sample stream. Without any suggestion of using a specific angle of about 35.3 degrees from a line parallel to a sample stream trajectory in order to selectively detect radiation independent of anisotropic radiation emission, Howie et al. cannot anticipate the claimed invention.

As further evidence that claims 1, 5, 6, 10, 11, 12, 13 and 18 are unobvious in view of the cited art, Applicants submit that the claimed invention satisfies a long-felt need in the field of flow cytometry. Specifically, a long standing problem in flow cytometry prior to discovery of the claimed

invention was that polarization-related differences in the response of different instruments interfered with the ability to standardize quantitative measurements. This need has been recognized by those skilled in the art, and is documented, for example, in the fourth edition of Shapiro, H.M., "Practical Flow Cytometry," (Wiley Liss, Inc. Hoboken, New Jersy), (EXHIBIT A) page 114, second column:

> The bottom line for most users is that polarization-related differences in the response of different instruments may interfere with the standardization of quantitative fluorescence measurement. The bottom line for those of us who develop and manufacture instruments is that we need to determine the nature and extent of those differences, in hopes of reconciling results from existing systems and improving the design of future systems.

Applicants point out that the long-felt need described above has been satisfied by the claimed invention, which solves this problem by selectively detecting radiation independent of anisotropic radiation emission. The fulfillment of this need in the art of flow cytometry is acknowledged in Shapiro, which states that:

> A simple solution was suggested by Asbury, Uy, and van den Engh; placing a polarizer at the so-called "magic angle" (54.7 degrees for linearly polarized source emission) in the light path of each fluorescence detector removed the dependence of intensity measurements on polarization, with only a modest loss of overall signal intensity.

Given that the claimed invention provides the only recognized solution to a long-felt need acknowledged by those skilled in the art, Applicants submit that the claimed apparatus and methods are unobvious over Howie et al.

In view of the above, Applicants submit that Howie et al. neither suggests nor provides a motivation for producing the invention of claims 1, 5, 6, 10, 11, 12, 13 and 18, and moreover, that the claimed invention has satisfied a persistent need recognized by those skilled in the art of flow cytometry. For these reasons, Applicants submit that the claimed invention is unobvious over Howie et al., and respectively request that this rejection under 35 U.S.C. §103(a) be removed.

Claims 2 to 4, 7 to 9 and 14 to 17 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over Howie et al. in view of Batchelder et al. (U.S. Patent No. 5,037,202). The rejected claims are dependent claims directed to more specific embodiments where the trajectory of a sample stream is orthogonal to the irradiation source or to a signal detector or where the trajectory is parallel to the direction of polarization. The Office Action alleges that it would have been obvious to modify the device of Howie et al. with the device of Batchelder et al. in order to achieve optimum detection conditions by selecting the polarization state relative to the direction of sample flow and arrange the detectors accordingly.

Batchelder et al. does not cure the deficiencies of the primary references in describing the claimed invention. Batchelder et al. is directed to an optical system for transmitting a focal plane that is useful for classifying particles. The reference does not teach or suggest anisotropic effects or that measurements independent of this phenomenon

would solve the problem of polarization-related differences in the response of different instruments that interfere with standardization of quantitative fluorescence measurement. The specific orientations of the radiation source, detection means and direction of polarization allegedly described by Batchelder et al. are therefore irrelevant absent some suggestion of an angle for selectively detecting emitted radiation that is independent of any anisotropic effect because neither Howie et al. nor Batchelder et al. suggest or provide any motivation to do so. Without any suggestion of selectively detecting radiation independent of anisotropic radiation emission using the recited geometries, the cited references cannot render the claimed invention obvious. Accordingly, Applicants respectively request that this ground of rejection be removed.

CONCLUSION

In light of the remarks herein, Applicants submit that the claims are now in condition for allowance and respectfully request a notice to this effect. Should the Examiner have any questions, he is invited to call the undersigned attorney.

Respectfully submitted,
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